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FUNGICIDE BENEFITS ASSESSMENT

National Agricultural Pesticide Impact Assessment Program (NAPIAP)

**United States
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Agriculture**



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January, 1991

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United States Department of Agriculture
Animal and Plant Health Inspection Service

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This Report Represents a Portion of the USDA/States
National Agricultural Pesticide Impact Assessment Program (NAPIAP)
Fungicide Assessment Project

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PREFACE

Plant diseases affect all the major food crops world-wide and must be controlled to prevent significant production losses and maintain food quality for animals and humans. In addition, fungicides are a necessary factor in maintaining the availability of fiber and landscape improvements ranging from forest management to enhancements through the use of ornamentals. Agricultural fungicides are a significant component in effective disease control and are critical to plant health management systems. Fungicides provide benefits to producers as well as consumers and to local as well as national economies. Farmers benefit from the prevention of yield losses, improved crop quality, enhanced market opportunities, facilitation of farmwork and harvest. Consumers also benefit from an ample, varied, safe, healthy and inexpensive food supply that is available throughout the year.

This is one of 11 separate reports that assessed the beneficial aspects of fungicide use in U.S. agriculture. The 11 reports, all using a commodity approach in evaluating fungicide use, comprise the Fungicide Benefits Assessment. This assessment represents one part of the USDA/States National Agricultural Pesticide Impact Assessment Program's Fungicide Assessment Project. The two other parts deal with (a.) a treatise examining the health and environmental factors associated with the agricultural use of fungicides, and (b.) an assessment of the status as well as the management strategies for fungal resistance to fungicides in the U.S.

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FUNGICIDE BENEFITS ASSESSMENT PROJECT

REGULATORY

(Includes Uses on Import and Export Commodities)

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I. INTRODUCTION:

The use of fungicides in regulatory activities is very limited. Certain commodities are required by law to be treated as a condition of entry into the United States. In some cases, the commodity is treated if, upon inspection, treatable harmful organisms are detected. Most fungicide treated plant products offered for entry to the U.S. are for propagative purposes. In addition, some countries require that certain commodities be treated with a fungicide as a condition of entry.

Most plants are treated with fungicides in the country of origin so that plant products exported from the country into the United States are pest free. If these products are to be exported for consumption, they are usually treated in accordance with label specifications so that acceptable residue levels can be obtained. If, upon arrival, the residues are below established tolerances, the product can enter the U.S. market for consumption. The use of source-country nonregulatory treatments is beyond the scope of this report. If specific fungicides were banned for use in the U.S., countries that export foodstuffs would probably have to restrict the use of these chemicals also so that residue limits could be met. However, these countries may still use the fungicides even if they are banned in the U.S. to control endemic pests.

There are no specific fungicide use requirements for the interstate movement of plant products. Even though many states regulate the movement of plant products and require certification, this is based on source state inspection.

The following information outlines the regulatory uses of fungicides. These are mandatory treatments required by the U.S. or destination countries. Also included in this report is information on the nonregulatory uses of fungicides directly applied to commodities for import or export. These uses are addressed here since they are not covered elsewhere in the Fungicide Benefits Assessment Report.

II. Background:

A. Uses of Fungicides for Imported Commodities

1. Quarantine Uses

There are specific instances in the USDA Quarantine regulations that require the use of fungicides; however, these have been administratively removed.

Though not mentioned in any regulation, Vitavax 200 is prescribed as a treatment for flag smut and PCNB for karnal bunt of wheat. These treatments are used for importations of normally prohibited wheat seed under Departmental Permit. This is the only mandatory treatment for normally prohibited plant materials imported under Departmental permit. Nursery stock and seed is occasionally treated with broad spectrum fungicides if found infected with

certain diseases.

2. Non-Quarantine Uses

Some seeds are treated with fungicides before they arrive in the United States. Generally this is done only at the request of the importer. Since plant quarantine authorities inspect seed entering the U.S. for insect and disease contamination, the fungicide must be washed off before the seed sample is examined or the seeds may be refused entry.

B. Uses of Fungicides on Exported Commodities

1. Quarantine Uses

A number of countries require that certain seeds and/or propagative material be treated with broad spectrum fungicides or specific fungicides as a condition of entry. These countries and their requirements are as follows:

Canada -

*alfalfa seed must be treated with Thiram at the rate of 4 ounces a.i. per 100 lbs. of seed.

*wheat seed must be treated with Carboxin (one option) according to label.

Chile -

*listed seed species (24) must be treated with Benomyl, Thiram, Captan or Thiabendazole as prescribed.

France -

*soybean seed under certain levels of infestation with Diaporthe spp., must be treated with Captan or another seed protectant.

Hungary -

*sunflower seed must be treated with Metalaxyl.

Italy -

*See entry under France.

New Zealand -

*Most seeds of grasses, cereals, trees and shrubs require one of the following treatments as prescribed: Carboxin and Thiram or Triadimenol and Fuberidazole or Benomyl and Thiram.

Saudi Arabia -

*All seed is required to be treated with a broad spectrum fungicide.

South Africa -

*Most seed must be treated with a broad spectrum fungicide.

Spain -

*See entry under France.

2. Non-Quarantine Uses

The major use of fungicides in this category is for seeds. Most seeds for export are routinely treated in the U.S. with a protectant fungicide. Some of the seeds listed in this category require mandatory treatment as described in the last section. Table 1 is a compilation of data from several different sources. It lists the type of seed exported, the quantity and export value of each, the kind of fungicide used and the percent treated. The percentage of seed treated was derived from a survey of 20 seed companies and is an estimated value only.

Table 1. Fungicide Usage on Exported Seed

<u>Kind of Seed</u>	<u>Export Quantity (Kg)</u>	<u>Export Value (\$)</u>	<u>Fungicide</u>	<u>Percent Treated</u>
<u>Vegetable Seed</u>				
Bean	12,442,663	13,752,686	Captan, Chlorpyrifos	90
Beet	164,446	720,805	Captan, Thiram	90
Carrot	603,280	3,102,596	Thiram, Benomyl Captan	90
Cantaloupe	498,872	3,921,689	Captan, Thiram	100
Cucumber	518,259	5,533,144	Captan, Thiram	100
Lettuce	121,139	1,353,817	Captan, Thiram	100
Melons	1,293,663	10,458,715	Captan, Thiram	100
Onions	496,167	7,546,430	Captan, Thiram	100
Pea	21,732,177	14,077,016	Captan, Thiram	100
Pepper	310,903	2,251,488	Captan, Thiram	100
Radish	2,138,371	5,929,036	Captan, Thiram	100
Spinach	1,121,212	2,995,605	Captan, Thiram	100
Squash	635,640	5,477,796	Captan, Thiram	100
Sweet corn	8,390,573	17,617,074	Captan, Thiram	100
Tomato	437,480	8,717,161	Captan, Thiram	100
Watermelon	794,791	6,537,026	Captan, Thiram	100
Other Vegetables	7,213,447	55,792,221	Captan, Thiram	90

Table 1. Fungicide Usage on Exported Seed (continued)

<u>Kind of Seed</u>	<u>Export Quantity (Kg)</u>	<u>Export Value (\$)</u>	<u>Fungicide</u>	<u>Percent Treated</u>
<u>Field and Forage Seed</u>				
Alfalfa	8,790,448	27,395,392	Captan	65
Bentgrass	2,250,669	7,480,142	Metalaxyl	50
Corn	32,638,155	60,397,839	Captan	90
Fescue	6,878,543	11,821,062	Metalaxyl	50
Ryegrass	11,099,363	3,875,806	Metalaxyl	50
Sorghum	52,230,693	43,797,394	Captan	90
Soybean	119,416,844	54,267,599	Captan	75
Sudangrass	4,932,853	3,356,153	Captan	70
Sunflower	6,083,320	5,461,030	Metalaxyl	60

Based on the data from this table and assuming the seed was treated at a rate of 9 ounces (255 grams) a.i. per 100 pounds (45.4 kilograms) of seed, it can be calculated that approximately 3,837,805 pounds (1,742,363 kg) of fungicides are used for this purpose.

III. Conclusions:

In the required regulatory area, the effect of losing the use of fungicides for imported material would be minor. Some propagative material would not be enterable into the U.S. The biggest effect would be felt in the export of seed to countries where mandatory treatments are required. The markets for these products would probably be lost unless provisions were set-up to treat the seed upon arrival.

In the nonregulatory area, the impact of restricting the uses of fungicides would affect primarily the seed industry. The effect would be in the inconvenience this would cause the grower in the importing country who would have to have the seed treated in his country. This may cause a loss in sales to the U.S. exporter. In turn, the U.S. chemical producers and associated industries would lose a tremendous amount of business resulting in loss of income to the companies and jobs of the employees.

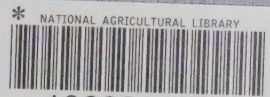
The major impact in eliminating uses of fungicides would be in field control of diseases. Without normal field control practices, many agricultural products could not be produced to meet the quality and phytosanitary requirements of most countries. The use of fungicides in controlling various diseases in the field is addressed in other portions of the Fungicide Benefits Assessment Report.

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